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Implementation of P2P network for search algorithm

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Abstract: ***A peer-to-peer, commonly abbreviated to P2P, is any distributed network architecture composed of participants that make a portion of their resources (such as processing power, disk storage or network bandwidth) directly available to other network participants, without the need for central coordination instances (such as servers or stable hosts). Peers are both suppliers and consumers of resources, in contrast to the traditional client-server model where only servers supply, and clients consume.***

In a P2P network which employs the use of a purely decentralized design, and where everyone participates equally in the network as both a client and a server. Machines were assumed to be always switched on, always connected and assigned permanent IP.

In this paper, we propose the Modified Search algorithm to improve the search efficiency of unstructured P2P networks by giving higher querying priority to peers with high querying reply capabilities which is based on bandwidth, locality, reliability and quantity of available data. We categorized all peers based on their performance in the network. Our experiment shows that the Modified Search algorithm can improve the search efficiency without resorting to index operations. Our simulation shows that the Modified Search algorithm increases the efficiency of network from 20 to 89.28 percent.

Keywords*: *Unstructured P2P Network, Search Algorithm, Opnet Simulator

I. INTRODUCTION

Computing has passed through many transformations since the birth of the first computing machines. A centralized solution has one component that is shared by users all the time. All resources are accessible, but there is a single point of control as well as a single point of failure.

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A distributed system is a group of autonomous computers connected to a computer network,

which appears to the clients of the system as a single computer.
Distributed system software allows computers to manage their activities and to share the resources of the system, so that clients recognize the system as a single, integrated computing facility. Opportunity to attach components improves availability, reliability, fault tolerance, and performance. In such systems, the methods for minimizing communication and computation cost are significant. The widely used client–server model is an example of a distributed system. In this model, the servers are optimized to offer services to several clients.

P2P networks have become a dominant part of the Internet traffic due to the tremendous success of file-sharing systems like Guntella and KaZaA. There are mainly two types of P2P overlays: structured and unstructured ones. Structured overlays tag the peers with peer identifiers thus providing an efficient support for distributed hash table (DHT). The shared data placement and topology characteristics of the network are tightly controlled based on the DHT.

In contrast to structured overlays, unstructured overlays do not follow any specific topology characteristics, so no clue emerges as to where content is located. In spite of this apparent disadvantage, unstructured P2P networks have several desirable properties not easily achieved by structured counterparts — they support inherent heterogeneity of peers, are highly resilient to peers' failure and incur low overhead at peer arrivals and departures. Besides, they are simple to implement and nearly incur no overhead in topology maintenance. Consequently, unstructured networks are

becoming more and more popular as they are flexible enough to be optimized for specific applications.

II. Previous Work

Yu Jin Yan Liu Hongwu Zhao [1] presented a new trust-based supernode selection method that is complementary to the only-capability selection. They used the concept of proxy trust to identify the behaviors of supernodes. With this metric a peer can select its own trusted supernodes and isolate malicious supernodes in the system. Furthermore in order to reduce network cost, they do not adopt basic flooding mechanism, but a limited one to distribute the trusted supernodes list requests.

Wang Ping Qiu Jing Qiu Yu Hui [2] proposed one search algorithm based on gossip algorithm with referral trust, in which peers can disseminate the query with low traffic and better efficiency. Fuyong

Yuan Jian Liu Chunxia Yin [3] proposed ranked neighbor caching scheme and queryhit caching scheme. The proposed algorithm can extend the search region but reduce the search traffic, and also balance the network load, so that acquires the whole networks scalable.

Cuihua Zuo, Hongcai Feng and Cao Yuan [18] presented a key-peers based topology control mechanism to reduce the traffic load and improve the availability of the sharing resources in unstructured P2P networks. Due to inherent heterogeneity of peers in P2P network, a few peers (called key-peers) directly affect the connectivity of P2P overlay topology.

Therefore, it is particularly important to explore these peers. They regard P2P overlay topology as an undirected graph, and analyze the similarities and differences between cut-nodes in graph theory and key-peers in P2P networks. Then they use the related principles about cut nodes and the reachability relationship of nodes to detect the key-peers of P2P network. Furthermore, they adjust P2P overlay topology based on these key-peers.

Finally, compared to the original P2P overlay topology, the modified topology using the approach can perform much better in success rate and respond speed, especially for rare resources.

III. Search Algorithm

This paper proposed the new technique for unstructured P2P networks to reduce the overheads traffic and to get the required data efficiently from the network. The proposed concept shows the better efficiency than previously described methods which are based on single or two tire systems in addition applied semi-supervised decision approach make the system to take very refine decisions in categorization of ultra peers.

We propose the Modified Search algorithm which is a modification over old search algorithm to improve the search efficiency of unstructured P2P networks by giving higher querying priority to peers with high querying reply capabilities. Our experiment shows that the Modified Search algorithm can improve the search efficiency & can reduce the overhead traffic.

IV. Opnet Simulator

OPNET Modular is a high level event based network level simulation tool. Simulation operates at “packet-level”, originally built for the simulation of fixed networks. OPNET contains a huge library of accurate models of commercially available fixed network hardware and protocols.

Nowadays, the possibilities for wireless network simulations are also very wide. Accurate radio transmission pipeline stage for the modeling of the physical layer (radio interface) is also used. The simulator has a lot of potentiality, but there exists typically a lack of the recent wireless systems. Much of the work considering new technologies must be done by oneself. OPNET can be used as a research tool or as a network design/analysis tool (end user). The threshold for the usage is high for the developer, but low for the end user.

V. Performance Evaluation

To measure the search efficiency improvement of the modified search algorithm, we use the metrics of the average network

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traffic, average query response time, and query success rate. The average network traffic per query is used to measure the query cost. The average query response time and the query success rate are used to measure the user perceived query quality, i.e., how long a user has to wait before a query result can be sent back to a querying node and how likely it is that a query can be solved.

We compare the search performance of the modified search algorithm with the flooding- based approach. The simulation results are shown in Fig. 1, and Fig. 2. The comparison shows that, the Modified Search algorithm can improve the search efficiency without resorting to index operations. Our simulation shows that the Modified Search algorithm increases the efficiency of network from 20 to 89.28 percent.

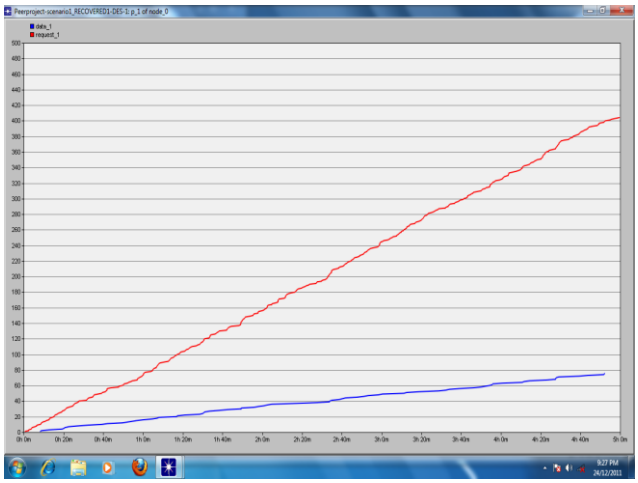

Fig 1: shows the Number of request Arrived (red) in network and numbers of file delivered (blue) to nodes when ultra peer formation disabled.

Fig 2: shows the Number of request Arrived red) in network and numbers of file delivered (blue) to nodes when ultra peer formation enabled.

VI. CONCLUSION

Peer-to-peer networks break the classical networking architecture of client-server relationship. By eliminating the server, or in general, the central point of authority, reliability in the system becomes a major challenge.

In this paper, we presented our contributions by adding reliable components and features to peer-to-peer networks. The algorithms described attempt to address several issues in peer-to-peer networks including topologies, throughput, and network metrics. The problems that we addressed are of complex nature, requiring us to reach into different areas for possible solutions with satisfactory results.

In typical peer-to-peer networks, end nodes have no guarantee in terms of connectivity. We address this issue by proposing algorithms that can provide low diameter connectivity to the participating nodes.

Our Modified Search algorithm significantly improves the performance of the network by using ultra peer overlay which basically created on the basis of maximum number of request serve in small time interval.

Improves network efficiency by serving more request created by the client as compared to the request arrived by the client.

Reduces the flooding problem which creates due to the number of request generated by clients to the server

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